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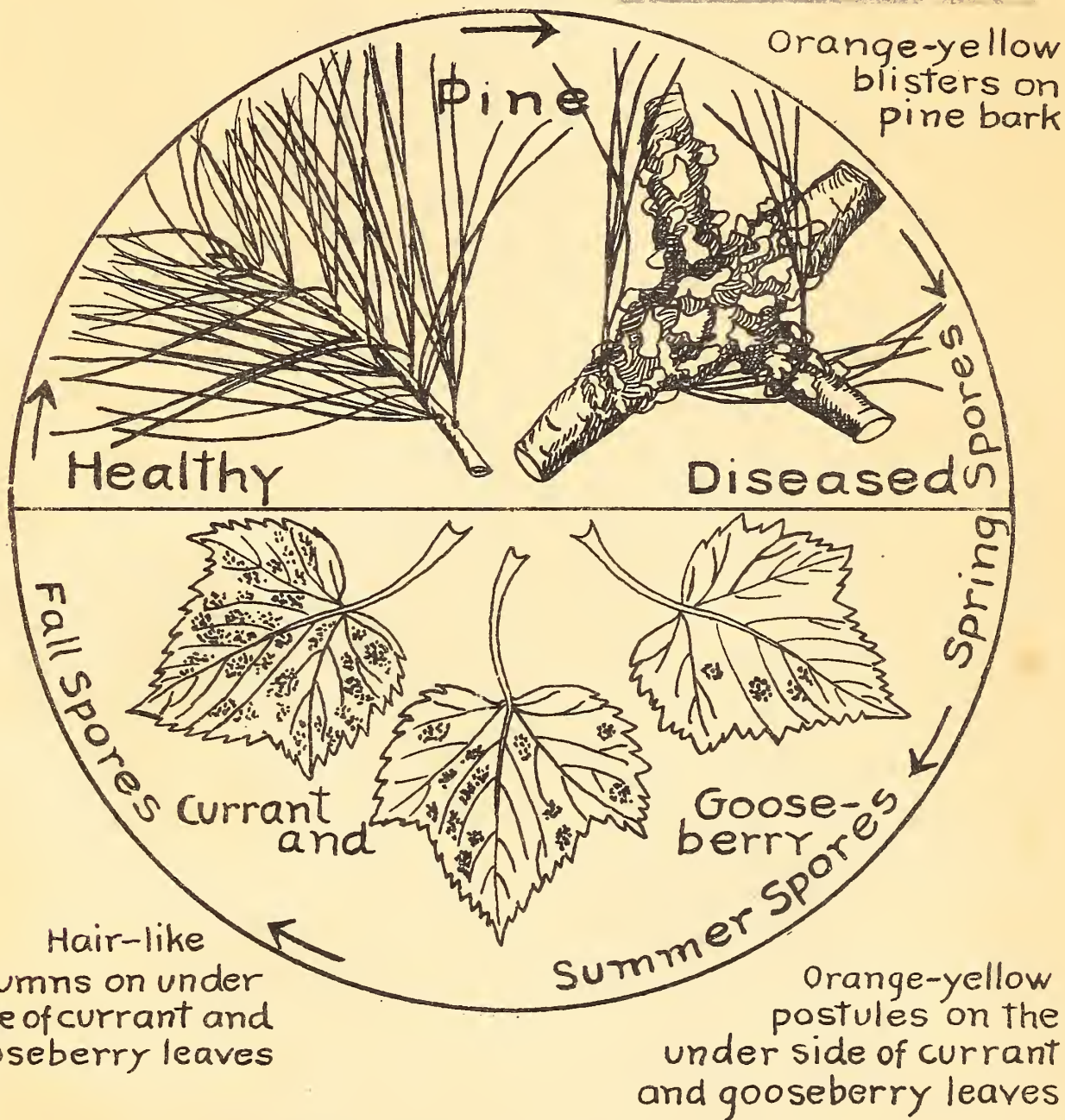
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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PLANT INDUSTRY

(and)  
COMMISSIONER OF FORESTRY AND FIRE PREVENTION  
STATE OF MINNESOTA

U. S. Department of Agriculture

Cooperating



WHITE-PINE BLISTER-RUST CONTROL

By  
Lawrence B. Ritter  
Agent in Charge

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Front Cover

LIFE CYCLE OF WHITE-PINE  
BLISTER RUST

Diagram on front cover  
adapted from diagram by:  
Colley, R. H. Parasitism,  
Morphology, and Cytology of  
*Cronartium Ribicola*. Jour-  
nal of Agricultural Research.  
15:619-659 1918

## PROTECTION OF MINNESOTA'S WHITE PINE

The 21 million acres of forests in Minnesota and the wild life that goes with them are one of the state's greatest resources. They produce wood, which we use in some form every day of our lives. They regulate the flow of streams and conserve the water supply. They add beauty to the country and have an immense recreational value. (Over a million tourists visited this state in 1929. It is estimated that they spent 10 million dollars here.) For these reasons the forest should be wisely used and protected from damage by fire, insects and disease.

The white pine might well be called our state tree. It was the basis on which was built Minnesota's lumber industry; the source of the initial wealth of the state. Because of its fast growth, utility, and ease of management it will be an important tree used in reforestation. White pine is one of our most beautiful native forest trees. In recent years this tree has been threatened by a serious disease, known as white-pine blister rust. This disease is very deceptive, and a tree may be infected for several years before its diseased condition becomes noticeable. Fortunately, blister rust can be controlled. Everyone can help by learning its characteristics and its control methods.

### WHITE-PINE BLISTER RUST AND ITS CONTROL

Blister Rust is a European disease. The white-pine blister rust was brought into the United States on young white-pine trees from Europe before there were any laws preventing or regulating the entry of plants into this country from foreign sources. The disease was first found near Philadelphia in 1905.

Since the discovery of this disease it has be-



come established in the New England States, New Jersey, New York, Michigan, Wisconsin, Minnesota, Montana, Idaho, Washington and Oregon. In Minnesota it was first found near Taylors Falls in 1916. It is spreading slowly but surely into the other white-pine areas of the state. It is now present in Aitkin, Anoka, Benton, Carlton, Cass, Chisago, Crow Wing, Hennepin, Isanti, Itasca, Kanabec, Lake, Mille Lacs, Morrison, Pine, St. Louis, Sherburne, Washington and Wright Counties.

#### WHITE-PINE BLISTER RUST IS A PARASITIC FUNGOUS PLANT

A fungus is a plant that does not have green coloring matter. Unlike green plants it does not make its own food but obtains it from living or dead matter. Blister rust is a parasitic fungus that lives in the bark of white-pine trees and in and on the leaves of currants and gooseberries.

#### BLISTER RUST CANNOT SPREAD FROM PINE TO PINE

Blister rust is spread by spores which might be considered very tiny seeds. Spores produced on the infected pine in the spring spread the disease to currants and gooseberries. Spores produced on the leaves of currants and gooseberries during the summer spread the disease to other currants and gooseberries. A third kind of spores produced on the currants and gooseberries in the late summer and early fall spread the disease to white pine. Only these "fall" spores can produce pine infection.

#### APPEARANCE OF BLISTER RUST ON WHITE PINE

On white pine, blister rust produces bark cankers. These cankers often take the form of spindle-shaped swellings of the bark with a yellowish discoloration around the edges. These discolored swellings are rarely recognized as blister rust by

anyone other than a person trained in their identification. In the spring of the third or fourth year after infection takes place millions of dust-like spores are produced in orange-colored blisters about the size of navy beans on these cankers. These spores are carried by the wind many miles to the leaves of currants and gooseberries.

#### APPEARANCE OF BLISTER RUST ON CURRANT AND GOOSEBERRY BUSHES

The blister-rust disease will attack any currants and gooseberries, wild or cultivated. In the early summer it appears as orange-colored spots on the underside of the leaves of currants and gooseberry bushes. The spots produce spores that spread the disease to other nearby bushes. Later in the summer these spots are gradually replaced by brown hairlike growths which produce the spores that spread the disease to pine. Blister rust seldom spreads over 900 feet from currants and gooseberry bushes to white pine. However, the European or as it is commonly called, the cultivated black currant, may spread the disease to pines a mile or more distant. In Minnesota it is against the law to grow cultivated black currants or to plant any currants or gooseberries in areas where the white pine is an important forest tree.

#### BLISTER RUST ATTACKS AND KILLS ONLY THE WHITE PINE

White pine can be distinguished from other Minnesota pines (Jack and Norway) by its fine needles, three or four inches long, growing five in a cluster or bundle and by its cones, which are five to six inches long.

The blister-rust fungus enters the white pine through the needles, grows down into and lives in the inner bark. The infection may take place on



the trunk of the tree or it may grow down a branch into the trunk.

The fungus robs the tree of its food and kills the bark. Thus, when it has completely encircled the trunk the flow of sap is shut off and the tree dies from girdling. Small trees are killed much more quickly than the larger ones.

## UPROOT CURRANTS AND GOOSEBERRIES TO SAVE THE WHITE PINE

Blister rust can be controlled by uprooting all wild and cultivated currants and gooseberry bushes within 900 feet of white-pine trees. All cultivated black currants within one mile of white pine must be destroyed.

Under most conditions a crew of five or six men working six to eight feet apart in line, in charge of an experienced foreman, will give good results in removing currant and gooseberry bushes from white-pine stands. Where currant and gooseberry bushes are scarce a smaller crew can be used. These men work through the pine area - strip by strip - uprooting and hanging up all currant and gooseberry bushes found, so that they will dry out and die. This work is carried on from the time the leaves appear in the spring until they drop in the fall. The Minnesota Forest Service will furnish free of charge an experienced foreman to aid the men employed by the pine owner in destroying currant and gooseberry bushes in white-pine stands.

## WHAT HAS BEEN DONE IN MINNESOTA

The Minnesota Forest Service and the United States Department of Agriculture are jointly pursuing a campaign to establish and maintain control of this disease on all areas containing valuable white-



pine growth. Control of the disease has been established on 4,981 acres in this state. The important areas in which some control work has been done are Itasca, Jay Cooke and Interstate Parks.

#### FACTS ABOUT THE MINNESOTA BLISTER-RUST LAW

Blister-rust control work in Minnesota is carried on by the Commissioner of Forestry and Fire Prevention, under the authority of the provisions of Chapter 218, Session Laws of 1929, which provide as follows:

Section 3. Any white pine or currants and gooseberries within the state found to be infected with white-pine blister rust are a public menace and may be destroyed by the Commissioner or his agents.

Section 4. The Commissioner may designate blister-rust control areas within the state where control measures are necessary or advisable. It shall be the duty of every land owner within such a designated area to carry out such control measures as are ordered by the Commissioner, including the removal and destruction of any or all wild or cultivated currants and gooseberries or white pines and no currants and gooseberries shall be planted within such a blister-rust control area without written permission from the Commissioner. If the owner fails to destroy the above-named plants within the time specified by the Commissioner, the Commissioner shall cause said plants to be destroyed and the expense thereof shall be a lien upon the owner's land. Such a lien shall have the same effect and may be collected in the same manner as taxes on such land.

Section 8. The State Inspector of Nurseries and his agents have the same power as the Commissioner of Forestry and Fire Prevention for the suppression and control of blister rust on land within or contiguous to any nursery in the state.

